IS 3730 (1988): High Density Polyethylene Bucket [PCD 12: Plastics]

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(Reaffirmed 2005)

Indian Standard

SPECIFICATION FOR HIGH DENSITY POLYETHYLENE BUCKET

(First Revision)

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Indian Standard

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(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards on 9 January 1988, after the draft finalized by the Plastics Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

0.2 High density polyethylene (HDPE) buckets are being produced in large quantities in India. The main advantages possessed by these buckets are low mass, unbreakability, ease in handling, safety in use, resistance to boiling water and resistance to most of the chemicals. This standard is intended to serve as a guide in assisting the manufacturers to upgrade the quality of buckets currently produced in the country and the Committee responsible for its preparation has taken special care to see that the consumers' interest is fully protected.

0.3 This standard was first published in 1966. In this revision, requirements for drop test and UV protection have been included, and requirements for distortion test has been made more stringent. Further the requirements for colour fastness to light, reversion, splitting and surface attack have been deleted.

0.3.1 Buckets are also likely to be used for storage of foodstuffs. Therefore, the material used for making buckets for this end use shall be food grade. Accordingly material clause has been amplified to cover this exigency.

0.4 This standard contains **3.5** and **4.2** which call for agreement between the purchaser and the supplier.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Rules for rounding off numerical values (*revised*).

1. SCOPE

1.1 This standard prescribes the requirements, and methods of sampling and test for HDPE buckets of up to 20-litre capacity, the sizes commonly used in household and industry.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given in IS : 2828-1964* shall apply.

3. REQUIREMENTS

3.1 Material — The buckets shall be moulded from natural or coloured HDPE. The HDPE used for injection moulding of buckets shall be of grade 45 MA or 54 MA (*see* IS : 7328-1974†).

NOTE — If the buckets are to be used for temporary storage of food articles then the basic resin and other additives shall conform to IS : 10146-1982‡.

3.2 Appearance — The buckets shall have smooth surface finish without any blemishes. Any spruce (stalk) shall be neatly removed by milling or by cutting. The buckets shall be free from moulding flash.

3.3 Handle — The handle shall be rigid and made of metal, coated metal or HDPE. Where metal handles are used, they shall be corrosion resistant. If they are injection moulded, then the HDPE used shall be of grade 45 MA or 54 MA (*see* IS : 7328-1974*).

3.4 Construction

3.4.1 The base of the bucket shall be so designed that it does not come in contact with the plain surface on which it is placed, when the bucket is filled with water at 60°C. It shall be thickened in lenticular fashion near the gate. They shall

*Glossary of terms used in the plastic industry.

†Specification for high density polyethylene materials for moulding and extrusion.

‡Polyethylene for its safe use in contact with foodstuffs, pharmaceuticals and drinking water.

*Specification for high density polyethylene materials for moulding and extrusion.

have low standing ridge with rounded transition having 0·5 to 1·5 mm radius.

3.4.2 The handle shall be so constructed and attached that it will swing freely outside the bucket.

3.4.3 The centre of the handle shall be such as to provide on adequate grip.

3.5 Mass — The minimum mass of the bucket shall be as agreed by the purchaser and the supplier.

3.6 UV Protection — Wherever the bucket is to be exposed to sunrays, it shall contain ultra violet absorbers — type and percentage — shall be as specified in IS : 10141-1982*.

3.7 Colour Fastness

3.7.1 *Colour Bleeding* — The buckets shall pass the test prescribed in **12** of IS : 2530-1963†.

3.7.2 *Colour Fastness to Water/Soap Solution/ Detergent* — The buckets shall pass the test prescribed in **13** of IS : 2530-1963†.

3.8 Distortion Test — The buckets shall fulfil the following requirements when tested as prescribed in Appendix A:

Increase in diameter of top, at right angles to the handle *d, Max*	: 5 percent of initial
Increase in depth from rim to bottom of bucket *h, Max*	: 3 percent of initial

3.9 Overload Test — No part of the bucket or handle shall break and the handle shall not become detached from the bucket at either side when tested as prescribed in **A-2.**

3.10 Drop Test — A bucket filled with water to its nominal capacity shall withstand three falls when dropped vertically on a flat concrete surface/ MS sheet from a height of 1 metre.

4. MARKING AND PACKING

4.1 Marking — Each bucket shall be marked with the manufacturer's name and trade-mark, if any, and the water capacity at room temperature in litres.

4.1.1 Each bucket shall be supplied with a label giving the following instructions:

a) Wash with warm water containing soap or detergent;

b) Avoid abrasive or scouring powders;

c) Do not place on a hot stove or near a fire; and

d) Do not place hot utensils inside, unless there is water in the bucket.

4.1.2 The buckets may also be marked with the Standard Mark.

NOTE — The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act 1986 and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers, may be obtained from the Bureau of Indian Standards.

4.2 Packing — The buckets shall be packed as agreed to between the purchaser and the supplier.

5. SAMPLING

5.1 Representative samples of the buckets shall be drawn and conformity of the material to the requirements of this specification shall be decided according to the procedure prescribed in Appendix B.

*Positive list of constituents of polyethylene in contact with foodstuffs, pharmaceuticals and drinking water.

†Methods of test for polyethylene moulding materials and polyethylene compounds.

APPENDIX A

(*Clauses* 3.8 *and* 3.9)

TESTING OF POLYETHYLENE BUCKETS

A-1. DISTORTION TEST

A-1.0 Outline of the Method — Distortion test is carried out by hanging a bucket filled with water at 60°C and then determining the increase in diameter and depth of the bucket.

A-1.1 Procedure — Suspend the bucket by its handle at the centre from a double hook, the arms of which are approximately 75 mm apart (*see* Fig. 1). Measure the diameter *d* of top at right angles to handle (including spout, if any) and depth *h* from rim to bottom of bucket. Pour water at 60°C until it is filled to a level of 25 mm from the rim. After five minutes, measure *d* and *h*, and report the increase in dimensions as percentage of the initial dimensions.

A-2. OVERLOAD TEST

A-2.0 Outline of the Method — Overload test is carried out by hanging a bucket filled with specified load for a specified period and then examining for any break or detachment of the handle.

A-2.1 Procedure — Suspend the bucket as prescribed in **A-1.1.** Pour into the bucket lead shots or any other suitable material of a mass equal to twice that of the water required to fill the bucket. Examine the bucket or handle for any break or detachment of the handle from the bucket at either side after 30 minutes.

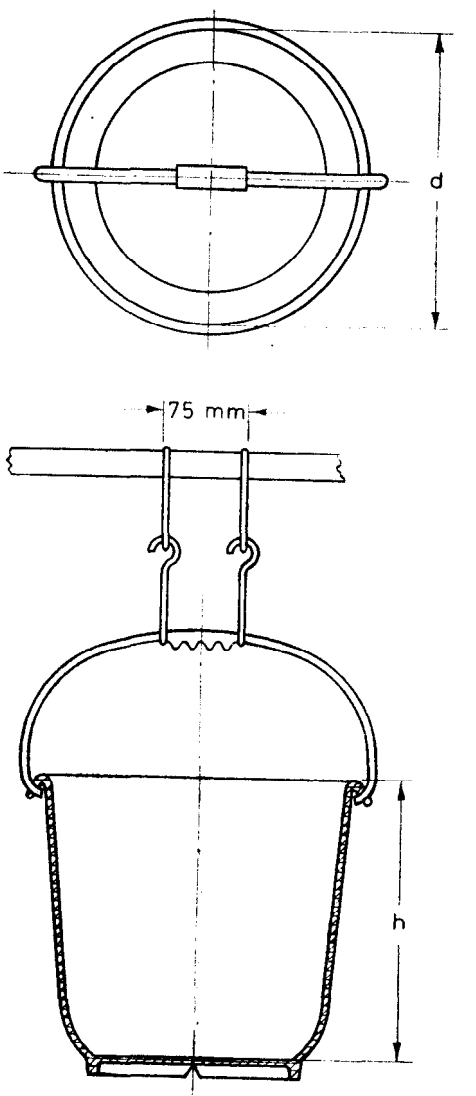

FIG. 1 APPARATUS FOR DETERMINATION OF DISTORTION

APPENDIX B

(*Clause* 5.1)

SAMPLING OF POLYETHYLENE BUCKETS

B-1. SCALE OF SAMPLING

B-1.1 Lot — In any consignment, all the buckets of the same size, same type and belonging to the same batch of manufacture shall be grouped together to constitute a lot.

B-1.2 For ascertaining the conformity of the material to the requirements of this specification, samples shall be tested from each lot separately.

B-1.3 The number of buckets to be sampled from a lot shall depend upon the size of the lot and shall be in accordance with Table 1.

TABLE 1 SCALE OF SAMPLING AND PERMISSIBLE NUMBER OF DEFECTIVES

Lot Size	For Appearance, Handle, Mass and Construction		No. of Buckets to be Selected for Distortion and Overload Tests	Sub-Sample Size for Colour Fastness and Drop Tests
	No. of Buckets to be Selected	Permissible No. of Defective Buckets		
(1)	(2)	(3)	(4)	(5)
Up to 50	5	0	3	2
51 to 100	8	0	5	2
101 to 150	13	1	5	2
151 to 300	20	2	8	2
301 to 500	32	3	8	2
501 to 1 000	50	5	13	3
1 001 and above	80	7	13	3

B-1.3.1 Test buckets shall be selected at random from the lot. In order to ensure randomness of selection, the procedures given in IS : 4905-1968* may be followed.

* Methods for random sampling.

B-2. NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

B-2.1 The buckets selected according to **B-1.3.1** shall be tested for appearance (**3.2**), handle (**3.3**), construction (**3.4**) and mass (**3.5**). A bucket failing to satisfy any one or more of these requirements shall be considered as defective. The lot shall be considered as conforming to the requirements for these characteristics if the number of defective buckets in the sample is less than or equal to the corresponding number given in col 3 of Table 1.

B-2.2 The lot having been found satisfactory according to **B-2.1** shall be subjected to distortion test (**3.8**) and overload test (**3.9**). For this purpose, the number of buckets given in col 4 of Table 1 shall be selected at random from the lot. These may be selected from those already examined according to **B-2.1** and found satisfactory. Each of these buckets shall be subjected to distortion test and overload test. A bucket failing in any of these tests shall be considered as defective. The lot shall be considered to have passed these tests if no defective bucket is found in the sample.

B-2.3 The lot having been found satisfactory according to **B-2.1** and **B-2.2** shall be finally subjected to drop test (**3.10**) and test for colour fastness (**3.7**). For this purpose, a sub-sample of the size given in col 5 of Table 1 shall be selected at random from the lot. These buckets shall be taken from those already examined according to **B-2.1** and found satisfactory. Each of the buckets in the sub-sample shall be first subjected to drop test and then tested for colour fastness. A bucket in the sub-sample failing in any of these tests shall considered as defective. The lot shall be declared as conforming to the requirements of this specification, if none of the buckets in the sub-sample is found to be defective.

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002
Telephones: 3310131, 3311375

Telegrams: Manaksanstha
(Common to all offices)

Regional Offices:	Telephone
Central: Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002	3310131, 3311375
*Eastern: 1/14 C.I.T. Scheme VII M, V.I.P. Road, Maniktola, CALCUTTA 700054	362499
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*Sales Office in Calcutta is at 5 Chowringhee Approach, P.O. Princep Street, Calcutta 700072 276800

†Sales Office in Bombay is at Novelty Chambers, Grant Road, Bombay 400097 896528

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